CHANGE PROPAGATION WITHIN A LARGE ORGANIZATION

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I Introduction

Several authors have recently drawn attention to the utility of studying diffusion phenomena in the fields of organizational learning (Koenig, 1994), strategy (Mintzberg, 1998), and innovation (Rogers, 4th edition 1995; Van de ven and Poole, 1995; Leonard-Barton, 1988). Within the field of change - which is here our particular field of interest - several authors (Anderson, 1985; Demers, 1992) have also encouraged researchers to take interest in the processes of change diffusion. Bartoli and Hermel (1986: 28) argue that the contagion process (in terms of diffusion) is the core process of any type of change:

> "*One of the fundamental organizational characteristics of change lies in its contagious or contaminating dimension, where neither of these expressions are to be taken in a primarily pejorative sense. This phenomenon, which results from what we call the 'contagious character' of change, seems to affect all kinds of changes within an organization*."

The 'diffusion process,' which we prefer to call 'propagation' (we justify this terminology in point III), constitutes an essential organizational phenomenon for both theorists and practitioners. Coming to an understanding of the factors on which managers can exert pressure in order to improve the pattern of change within a large company constitutes a crucial strategic stake in piloting large-scale organizational change.

Within the framework of this paper, we focus exclusively on the longitudinal analysis of one major change project within a large organization called Technico. This project, designated Work Force Management, targets automation, control, and follow-up of each work order transmitted to Technico's field technicians. A detailed elaboration of the project is presented below.

II. Research Objective

Our many contacts with Technico's top managers have revealed a strongly rational, linear conception of large-scale change implementation. This planned and mechanistic approach is based on the underlying hypothesis of a homogeneous organizational environment, through which change would be disseminated in an isotropic way, to a rhythm imposed by the designers. Nevertheless, theoretical currents concerning the planned change are the subject of seminal criticisms in the literature on the subject. In particular, we draw your attention to criticisms against the Organizational Development current by Pettigrew (1985: 4-14), against systemic currents by Crozier and Friedberg, (1977) and Morin, (1988), as well as to the observations of various socio-technical authors (Emery and Trist, 1969; Savall, 1980). They denounce the illusion of the overly linear and oversimplifying ways of reasoning about organizational reality. This conflict between theoretical developments and actual management practices poses real questions. Do managers run into implementation and propagation difficulties, across the change process ? Do they adapt themselves to the changing contexts ? Or do they generally reach the desired results, on the basis of their conception of linear and isotropic change processes ?

We believe that the theoretical study of change propagation processes has not yet been examined to any significant extent. Hence our research aims to elaborate a change propagation model within a large organization in order to detect triggers on which managers could act to master change at various organizational levels.

Our research questions are formulated as follows: ·

- Is the organizational change propagation process isotropic (*meaning that change would be disseminated throughout the organization at the same rate everywhere*) ?
- What are the main factors influencing the rate of the change propagation process within the organization ?

III. Definition of the core concepts

We prefer the notion of "propagation" to that of "diffusion" for two reasons. First, the concept of "diffusion" already constitutes a research trend in the field of innovation and marketing (Rogers, 1963, 1986, 1995; Bass, 1969) and gives the notion an essentially communication-oriented connotation. Moreover, the term "diffusion" lends a unidirectional character to the phenomenon studied, which seems to restrict the notion of change propagation.

From the etymological point of view, the word "propagation" comes from the Latin "propagare" and means "to perpetuate". Propagation is the fact of extending step by step. It is the progressive movement of energy in an environment, the reproduction by generation, or yet again the progress by expansion, by communication in an environment (Larousse, 1999; Petit Robert, 1999).

The definition proposed in several dictionaries naturally refers us back to physical phenomena such as the transmission of sound, light or electric waves. We opt for the term "propagation" by analogy with the propagation of a wave in physics. We observe a rich and stimulating parallelism. The Larousse dictionary (1999) defines "a wave" as the modification of a state:

> "*A wave is a modification of the physical state of a material or immaterial environment which is propagated by a local action [the source from which the required energy emanates],at a given speed, determined by the characteristics of the milieus through which it travels*."

As a wave spreads through a material or immaterial environment, change is propagated within the organizational environment at a given speed, determined by the characteristics of the milieus through which it has traveled

This analogy highlights the importance of context in the rate of propagation. Just as the wave starts from a local action (the source), large-scale organizational changes start from the top of the company. This refers to the voluntary nature of the type of change studied.

The analogy between physics and organizational phenomena leads us to propose the following definition of the "organizational change propagation" process.

Propagation is the **process** by which a **change** progresses through **a social environment** over **time** (at a given speed) and in an organizational **space**.

We wish to briefly clarify each concept used in our definition.

A PROCESS

Generally speaking, the dictionary definition presents a process as an orderly chain of facts or phenomena, corresponding to a specified pattern and aiming at a given result. In the field of organizational change, Van de ven and Poole (1995) define the process of change as a progression of events over time in the existence of an organizational entity, such as a set of actions, activities, operations which lead to a certain state or result (passage from state A to state B). The process analysis allows us to describe how things change over time (Van de Ven, 1992). Unlike changes as such, the change process cannot be directly observed. It must be inferred from the temporal successions of links between events.

A CHANGE

According to Van de Ven and Poole (1995), change is an empirical observation of measurable differences in form, quality, and state over time in an organizational entity. As a wave spreads through its environment following a local action, we consider that change is propagated within an organization as a consequence of a deliberate action conducted by organizational actors. Our concept is based on a voluntarist and deliberate hypothesis of organizational change, which places change triggers at the level of the individual. Astley and Van de ven (1983: 248-250) propose a synthesis of the classic opposition between change determined by the environment (external causes) and change resulting from the voluntary intervention of organizational actors (internal causes). We argue that organizational actors have a capacity for changing the organization, contrary to certain currents in the literature

which insist on organizational inertia and environmental determinism (Aldrich, 1979; Hannan and Freeman, 1984). Our point of view is supported by Koenig (2000: 165):

> "*Few people question the tenet that organizational changes often originates in deliberate projects (which doesn't mean that the results will meet the actors' intentions).*"

Besides the deliberate aspect of the intended change, we also focus on large-scale types of organizational changes. 'Large scale' is defined by Mohrman and al. (1989) in three dimensions : the organization‘s size, the depth of the changes, and their pervasiveness. We add the top-down nature of the change imposed as well as its speed of implementation. As asserted by Grouard and Meston (1998: 21):

> "*The pace of change is an increasingly important dimension in the context of a permanently changing company. Change is no longer sufficient in itself. It is necessary to change quickly to preserve and/or improve the firm's competitive position ... Speedy reaction and implementation are essential for companies which have to adapt themselves constantly, to innovate ...*"

It is interesting to study large-scale organizational change processes because of their risky, difficult, complex, unpredictable, and emotionally intense nature (Mohrman and al, 1989).

THE SOCIAL ENVIRONMENT

Along the line pursued by Rogers (1995) as well as the systemic approaches (Crozier and Friedberg, 1977; Morin, 1989), the social environment is defined as a system consisting of a series of interrelated units, connected by formal and informal links that are engaged in joint problem-solving to accomplish a common objective. The members of this system may be individuals, formal or informal groups, organizations, or subsystems. The social environment is a system which presents both a formal and informal structure.

TIME

At what rate will organizational members appropriate change? Are there different rates of change? Which factors accelerate or slow down the change propagation process? In many instances research into organizational change has often ignored the temporal dimension of the phenomenon. Pettigrew (1985, 1985b, 1990) has criticized the too frequently "a-historical, a-temporal and a-processual" character of numerous studies concerning organizational change. By definition, the study of change propagation processes requires a longitudinal research method in order to understand the phenomenon in its temporality as a whole.

ORGANIZATIONAL SPACE

The mechanism of the spatial deployment of change also constitutes a core factor of the process of propagation. Where does change start in the organization? Is there a spatial sequence in the propagation process, which would pass, for example, via local experiment, generalization, and extension phases, through to the whole organization? By definition, the process of propagation constitutes a spatial phenomenon whose every implication should be studied. The spatial and temporal dimensions open up two important avenues of research for analyzing organizational change propagation.

IV. Theoretical Corpus

Our research questions encourage us to focus on factors likely to influence the mechanisms of change propagation. After exploring several research paths, we extracted a useful theoretical basis on which to build a coherent model of propagation. In particular, we investigated the theory of diffusion of innovations (Rogers, 1961, 1971, 1995), which is rooted in rural and medical sociology (Ryan and Gross, 1950; Coleman and al., 1966), the theory of social contagion (Burt, 1987), the theory of social networks (Granovetter, 1985; Moreno, 1954, Degenne and Forsé, 1994, Rogers, 1995), and the theory of isomorphism stemming from the institutionalist current of thought(Di Maggio and Powell, 1983).

A. Theory of Diffusion of Innovations

The paradigm of the diffusion of innovations theory has its theoretical foundations in the works of Ryan and Gross (1950). Their research in rural sociology concerned the diffusion of agricultural innovations to potential adopters, mainly farmers. In particular, they highlighted (1) the roles of communication channels in conveying innovations, (2) the S-shaped rate of adoption, a curve that was tested to see if it fitted a normal distribution process, (3) the personal, economic and social characteristics of various adopter categories and (4) the classification of individuals on the basis of their promptness in adopting innovations (Rogers, 1995).

Medical sociology has also considerably influenced the theory of diffusion. The most important findings of medical sociology deal with interpersonal diffusion networks (Coleman, Katz and Menzel, 1966). The social system is a kind of collective-learning system. The experiences of the earlier adopters of an innovation, transmitted through interpersonal networks, determine the rate of adoption of their followers. These findings suggest that the informal communication networks of individuals play an important role in the diffusion of innovation (Coleman and al ., 1966).

Besides these domains, which have left their mark on the study of diffusion in numerous works, geographical tradition constitutes a minor but essential contribution to the theory of diffusion. Geographers emphasize space as a crucial factor affecting the diffusion of innovations. For example, Hagerstand (1952, 1953, quoted by Rogers) constructed a simulation model of diffusion, which takes into account the "neighborhood effect". This model shows that innovation is more likely to spread (in the next unit of time) from one adopter to another, provided the latter is in close proximity.

In the seminal works in the field of the diffusion of innovations, several authors (Kimberly and Evansiko, 1981; Tornatzky and Klein, 1982; Leonard Barton, 1988; Rogers, 1983, 1995; Wolfe, 1994) were interested in the factors that could influence the diffusion rate of innovations.

The individual factors

While the literature dedicated to innovation presents several classifications of potential users, Rogers (1995) proposes a categorization which has become a model standard in this field. She groups the potential users according to their innovativeness. She distinguishes between the innovators, the early adopters, the early majority, the late majority, and the laggards. The interest of this categorization of potential adopters is in attributing dominant characteristics to each category. For example, innovators seem to have a higher social status, a superior educational background and greater social participation than the laggards who are more dogmatic and fatalistic. In the same way, Kimberly and Evanisko (1981) propose 4 individual variables which, they say, are correlated positively to the rate of adoption of an innovation, in terms of seniority in a particular post, cosmopolitanism, educational background, and social participation. These variables, it is claimed, are directly connected to a higher level of receptivity towards new ideas. It is interesting to note that the age of the individuals was never the object of a clear correlation with the behavioral adoption of innovations (Rogers, 1995).

The organizational factors.

Several authors assert that internal organizational characteristics have a significant influence on the behavioral adoption of innovations (Kimberly and Evanisko,1981; Rogers and Shoemaker 1971; Meyer and Goes, 1988; Damanpour, 1991, Rogers, 1995). Nevertheless, several hundreds of studies concerning organizational innovation showed a relatively low correlation with structural variables (Rogers, 1995). One reason could be that the influence exerted by these variables fluctuates, depending on the stage of diffusion reached by the innovation processes.

Perceived attributes of innovations

Another important finding of research into the diffusion of innovations has been the identification of innovation attributes. Several researchers today have perceived innovation attributes as an important explanation of the adoption rate by potential users (Fliegel and Kivlin, 1966b; Rogers, 1983). Among numerous typologies of attributes presented in the

literature (Rogers, 1983; Tornatsky and Klein, 1982; Zaltman and al., 1973), it is difficult to fix a common denominator. Nevertheless, Rogers (1983, 1995) notices that 49 % to 87 % of the variance obtained in various cases of diffusion of innovative models are explained by 5 attributes which ostensibly influence diffusion (relative advantage, compatibility, complexity, triability and observability).

The environmental characteristics

The environmental context was often conceptually described as important in the diffusion of innovations but was rarely analyzed empirically (Kimberly and Evanisko, 1981). Competition seems to be one of the variables, which favors the likelihood of adopting an innovation (Ebadi and Utterback, 1984). It also seems that environmental complexity plays a role in the process of diffusion (Kimberly and Evanisko, 1981). From an institutional perspective, the environmental uncertainty in which an organization evolves can pressurize it to imitate other firms and adopt an innovation (Di Maggio and Powell, 1983). Another, more "rational" perspective, based on efficiency, claims that environmental changes create gaps between fixed objectives and real performance and induce companies to launch innovations (Grandori, 1987). These various perspectives argue that environmental context can influence the diffusion and adoption of the innovation process.

B. Social Contagion in Theory

The process of social contagion between firms, revealed notably by institutionalists, (Di Maggio and Powell, 1983) is based on contrasting explanations of contagion, connected either to competition mechanisms, conformity, or information transfer between firms belonging to the same population. This inter-organizational analysis of contagion seems to be entirely transposable onto individuals within the same organization. In the most straight-forward case, social contagion involves one individual "ego", who has not yet adopted the innovation and who is in contact with a second individual "alter", who has adopted it. Burt's study (1987) distinguishes between two important sources of social contagion: cohesion and structural equivalence. The cohesion model insists on frequency and empathic communication between ego and alter. The more ego is in contact with alter, the more alter influences ego's adoption decision. The model of social contagion by cohesion rests on explanations having to do with conformity and the exchange of information. Works in psychology (Homan, 1950; Festinger

and al., 1950, quoted in Burt, 1987), show that direct contact, translated into physical proximity, favors relationships such as friendship between individuals, whereas shared attitudes in a group are developed more by social proximity between individuals. This social proximity is at the heart of the structural equivalence model, which insists on competition between ego and alter. Structural equivalence is based on the fact that people occupy the same position in their social structure and so have a social proximity to the extent that they have the same pattern of relations with persons occupying other positions. The more similar ego's and alter's relations with all the other individuals, the more alter can stand in for ego in ego's relations and the more intense ego's feelings of competition with alter will be (Burt, 1987: 1301).

After a detailed analysis of Coleman's previous work (1966), Burt concludes that contagion is not the dominant factor driving the ongoing diffusion of medicine among pooled physicians. Where there is evidence of contagion, there is evidence of personal innovation-oriented preferences at work. Where social contagion occurs, there is strong evidence of contagion through structural equivalence, and not contagion through cohesion among physicians. To summarize Burt's work (1987), two factors drive the diffusion process: personal predisposition to innovate and contagion by structural equivalence. These cohesion and structural equivalence models are also the roots of the theory of social networks.

C. Social Networks in Theory

The social network analysis can help to explain part of the propagation process. The social network theory attempts to identify some subnetworks, for example a dominant coalition, within a system such as an organization. On the basis of the cohesion model (friendship), this theory identifies groups of individuals who are interconnected by strong, often bilateral, ties, and analyzes each group as a collective actor called a clique. On the other hand, the principle of structural equivalence allows us to include individuals who have identical links with the members of other networks, without necessarily having direct interactive relations. Apart from cohesion and structural equivalence effects, the social network theory also analyzes "central" and "marginal" individuals who belong to the network and play a crucial role in the propagation process.

According to Granovetter (1973), the strength of ties between people plays a dominant role in propagation processes. He presents the weak ties as bridging links to connect a small clique

of intimate friends with other, distant cliques. Whereas cliques run the risk of working behind closed doors and are often not very effective when it comes to obtaining new information, links between more distant individuals (the weak ties) are more apt to obtain new information. This explains the usefulness of the notion of weak ties in understanding the change propagation process. Even if weak ties are not a frequent path for the information flow, the information they convey is crucial for individuals and for the system (Roger, 1995). On the one hand, the weak ties play an essential role in conveying new information while on the other the strong ties play a fundamental role in the transmission of interpersonal influences within the cliques.

V. Conceptual framework of the research

Our review of the literature has allowed us to build a conceptual framework, which will constitute the general theoretical frame of our research. We shall try to understand how various factors extracted from the literature or from the field can influence the processes of change propagation.

Among researchers interested in the study of organizational change, Pettigrew's framework (1985, 1985b, 1990) is regularly quoted as a reference in the longitudinal study of change within organizations. In a contextualist perspective, Pettigrew proposes a pattern of analysis which relies on three key-concepts : context, content, and process. These generic categories have helped to structure the contributions of the various theories we reviewed. Inspired by seminal literature, we have defined contextual factors (both internal and external) around individual, organizational, and environmental dimensions liable to influence the rate of organizational change propagation. To these three dimensions, we have integrated group attributes (networks and so on) coming from social network and social contagion theories. The content factors will be studied on the basis of the attributes of change as perceived by the potential users.

Insert Figure 1 about here

VI. Research methodology

We opted for an in-depth case study within the Technico[1] Company. To familiarize us with our research field, we focused at first on analyzing internal and external documents as well as interviews with Technico's top management team (25 semi-structured interviews lasting an average of two hours). Given the essentially top-down nature of the changes operated within Technico, the top team really appeared as key-informants (Evrard and al., 1997). As well as this exploratory phase, within the framework of this article, we have chosen to present the first in-life analysis of one particular change project named WFM (Work Force Management). We compared several documents, observations, and interviews of organizational actors representing various hierarchical levels.

The WFM project began in January 1999 and we followed it up in real time, by being present in the field about two days a week. We chose a qualitative approach for several reasons. First, the study of change requires a direct, in-depth contact with the actors involved, in order to better understand the underlying mechanisms of change. Secondly, the qualitative research method based on case study monograph is recommended when focusing on contemporary events in their real-time context, where limits between the phenomena studied and the context are not evident (Yin 1989: 18). Finally, this methodology favors both a descriptive approach and a theoretical generation (Eisenhardt, 1989).

To test the isotropic character of the change propagation process generated by the WFM project, we opted for a reasoned choice sampling. Three criteria were retained to select sections (groups of technicians) who would be followed up: firstly, the starting date of the project to obtain a distribution of the sections examined over time; secondly, the geographic zone in which each section evolved. We wanted to obtain good coverage of the regions where Technico is present, to compare groups situated in geographically distributed places; thirdly, the group's qualifications, which allowed us to differentiate between two categories of sections: simple repair-oriented or complex repair-oriented sections. This characteristic constitutes, according to several field coaches, an important difference between sections. Individual characteristics such as age, professional experience, and educational background are relatively homogeneous in the various pooled sections. We have here a workforce with an

[1] Technico is a fictional name in order to maintain the anonymity of the company we are researching.

average age of over 45, with similar technical backgrounds, and seniority exceeding 20 years at Technico. To follow the comparative evolution of the sections chosen, we set up a research pattern based on three major phases.

Phase 1: Conduct of a written survey before and after the change was adopted.

The employees under observation consisted of 15 sections handling simple equipment and 9 sections handling complex equipment, representing a total of 306 technicians. We selected 10 sections (6 "simple" sections and 4 "complex" ones), distributed across the whole-observed geographic zone taking part in the sample. During local section meetings, we personally conducted the survey. We obtained a response rate of 32%, which represents 98 questionnaires. The questionnaire was nominative so that we could get in touch with the respondents later, in order to examine the subject-matter in detail and follow staff evolution over time. The method was generally very well accepted and prompted the respondents to complete the survey.

Phase 2: Follow-up of respondents by phone after 15 months of change adoption.

On the basis of the nominative questionnaire developed in phase 1, we contacted 70 field technicians personally by phone. We spoke to technicians from 10 of the sections selected in order to find out how their opinion had evolved with regard to the change generated by the new WFM system. To do this, we established a checklist to track the evolution of the target-population at successive moments in time. The purpose was to compare these checklists made at regular intervals among technicians from the same section and also between sections. The Miles and Huberman matrix (1991: 150) inspired us.

Phase 3: Data processing by comparing groups of respondents

Our data processing is inspired by grounded theory (Glaser and Strauss, 1967; Strauss and Corbin, 1990) and by qualitative data analysis techniques (Miles and Huberman, 1991). The main objective of our research is descriptive and thus relies on descriptive inference that doesn't exclude the role of interpretation by the researcher in order to generate a theory. On the contrary, interpretation plays an integrative role and leads to a better understanding in the formulation of hypotheses.

VII. Overview of Technico background

For more than 60 years, Technico operated in a stable monopolistic environment, which protected it from any fundamental changes in its internal organization. In the middle of the 1990s, the explosion of technological innovations, the opening of markets to competition and the arrival of a new CEO marked the beginning of a drastic transformation. A vast program of structural and cultural change was implemented, coupled with a plan of early retirement and retraining which affected more than half of the staff. The change program set up from 1996 onwards has helped to transform a strongly introspective technology-oriented company into a customer-oriented organization. To accompany this thorough transformation, a « Business Process Reengineering » (BPR) Center has been set up. Various basic operations are analyzed in depth to elaborate new, more efficient processes. The BPR Center coordinated various reengineering programs over two years and the reengineering team then suggested re-examining the "end to end" Installation&Maintenance process, by centralizing several core functions. The WFM project constitutes the continuation of a large re-engineering project which specifically affected Technico's Installation and Maintenance department (I&M).

The former I&M department worked in a very decentralized way, with more than 70 local offices, directed by a section leader, now called a "field coach". The section leader was in charge of area management. He was responsible for the administrative and technical follow-up of each technician, for fixing appointments with customers, for dispatching work orders to technicians, and for managing hardware suppliers. The new I&M department has set up 3 Integrated Assignment Centers (IAC) whose mission is to document all technical situations, and 6 Integrated Dispatching Centers (IDC) for the whole country. From a decentralized management in 70 autonomous local offices, the I&M department switched to the centralized management of key functions such as dispatching and technical analysis. This change constituted a tremendous upheaval for the actors involved in the process, on all organizational levels.

Insert Figure 2 about here

Since the creation of Integrated Dispatching Centers (IDC), the automation of the new I&M process is being envisaged. The Work Force Management (WFM) project has begun. Its aim is to design and implement, within the next two years, a sophisticated computer system able to collect, from within the IDCs, technical and commercial information to generate and automatically sort work orders and dispatch them to the field technicians. The plan is to replace fax transmission (figure 2) to the local offices by allocating a personal PC laptop to each field technician (figure 3). The employees will be directly connected to a central server by mobile phone connection.

Insert Figure 3 about here

The purpose of the system is to optimize work dispatching. The central server selects the most competent technicians who are nearest to the intervention site and sends them to carry out the job required.. The system permits an almost real-time follow-up of each field technician.

VIII. First results and Discussion

The purpose of this section is to provide food for thought arising from our study. Our research within Technico is still in progress, and this lends our first results a preliminary character which should advisably be confirmed by further analysis at a later stage. We shall formulate our first results around the two research questions proposed in our paper.

- **Is the change propagation process isotropic ?** *(Does change spread throughout Technico at the same rate everywhere?)*

Our first results seem to demonstrate that the change propagation process is on the contrary anisotropic (it is propagated at different rates). On the basis of the control carried out 15 months after 10 field sections (70 individuals) had been re-organized, we observed varying average support rates.

Insert Figure 4 about here

The graph seems to prove significantly different rates of propagation depending on the sections. These results are even more valuable because the employees surveyed were relatively homogeneous, in terms of individual characteristics, such as age (over 45 years), professional seniority (more than 20 years), and initial educational background.

We observed higher similarity in the evolution of the complex equipment sections (this aspect of our research does not fall within the scope of our paper).

Insert Figure 5 about here

The trends illustrated in the graphs above confirm the need to adopt a longitudinal approach in order to appreciate the propagation processes. Now, if we refer to the classic studies on the diffusion of innovation and the implementation of change, it is clear that the introduction of the WFM system at Technico could be deemed successful in terms of its innovation adoption rate. Much research on the subject of diffusion pursues its analysis only up to the decision by the end users to adopt innovation. Our study shows a clear gap between the behavioral change (use of the new system) and cognitive (acceptance of the system acceptance) change. It would be advisable to analyze the implications of this gap. Furthermore, it is surprising to observe that on average no "simple" section reaches the "level of change supporter" after more than one year of use in the field.

- **Which factors influence the change propagation process within the organization?**

We present our exploratory ideas in the form of hypotheses on the content and the context factors of our change propagation model (figure 1).

<u>Hypothesis 1</u>: The meaning the users attribute to change seems more important than its intrinsic content in the process of propagation.

The results of Figure 4, allow us to compare the most 'change supporting' section (Area 1) with the most 'change opposing' one (Area 5). By coding the survey and phone conversations, we were able to detect different perceptions about similar change. The Area 1 team members perceive the new system as a working tool which gives access to useful technical information.

> "It's great to work with the system. You can get all the information you need directly" [P11]
> "If you want information about a technical situation, there's now no need to phone around, you have the information straight away. If you want other information, you have it at once. If you want to test equipment or modify technical information, it's possible. To tell the truth I find that the whole set-up is very convenient." [P14]
> "I find the PC is like a working tool rather than a control tool" [P23]

Overall, the team members from Area 2 have a more negative approach to the new system. They look on it as a control tool that generates stress and wastes time.

> "It's a control tool, not a working tool.! It's just for sending statistics to our superiors » [P3]
> «With the PC, we are not going forward but backwards, it's a waste of time. The machine, which should dispatch the right work, sends us all over the place. That drives me crazy and I've headaches from stress." [P6]
> "It could be a good tool but it's really no more than a stress machine" [P15]

It is clear that the perceived attributes of change are strongly contrasting in these two sections. In the section from Area 5, it is not the system in itself that raises a problem but the use to which it is put..

> "The machine is only a machine. It's the way we are told to use it that is wrong." [P5]
> "The PC in itself it's not bad, it's the way it works." [P16]
> "The PC in itself isn't the problem, what matters is the way you use it." [P20]

Although the technical content was identical, we noticed that the field technicians held sharply contrasting views of the changes introduced by the system. On analyzing the interviews we were able to establish a link between the technicians' positive or negative perception of the new system and the specific context of the job on the ground.

<u>Hypothesis 2</u>: The local context (supervisors, local support forms etc.) constitutes a key factor, which influences the rate of change propagation.

Technico's middle management (supervisors) consists of heads of sections, now called "field coaches". Again, an interesting contrast appears between the employees from Area 1 and those from Area 5. In Area 1, opinions about the field coach are generally positive. He is perceived as a man close to his team, ready to help them when a problem arises. He really takes on the function of coach, by providing moral and technical support, by establishing a relationship of trust with the team members.

> "My coach is great. He always manages to satisfy the customer and to help his people. If you've a problem, you can phone, he is there. He motivates his people and he is always laughing. I find he creates a good atmosphere at work and that's really necessary because things aren't easy at the moment." [P11]
>
> I believe there must be a relationship of trust between the coach and the technician. Whenever there's a problem, our coach speaks directly to you and I like that !" [P12]
>
> "A coach plays a great role in the section. Our coach is there to help and support us rather than watch our every move, that makes all the difference." [P14]

On the contrary, in Area 5, the general opinion about the coach is rather negative. The coach has kept his status as the 'boss' inherited from the old company culture. He's technically good, but unapproachable, he's quite irritable and manages his people by applying pressure.

> "He himself feels the pressure and he passes it on to us. He is (always) on edge and that doesn't improve matters. When he wants us to do something, he gets someone else to do the asking, which goes to show that our relationship isn't good." [P1]
>
> "The coach is technically very competent but people management is not his strong point…. As soon as there's a problem, he gets on his high horse." [P4]
>
> "He flies off the handle for the slightest problem, so . you don't dare to ask him any more questions" [P9]
>
> "With a boss like him, you stay in your own corner, otherwise you get bawled out." [P10]

The supervisors are perceived quite differently, and noticeably so, in the two sections. Note too that, in Area 1, a local helpdesk was set up temporarily. It was on the personal initiative of the Area Manager who came along with the technicians for the first month after the change was launched. Two "Super Technicians" from the field were posted to the helpdesk for a month.. It seems that the homophily nature of these technicians favored knowledge transfers and gave very dedicated support to the field technicians. In other Areas, no local helpdesk was installed. Only a national helpdesk was set up by the WFM project team. Concerning this national helpdesk, several pooled technicians seemed reluctant to contact it; it was too far from their Area and was run by people they didn't know. With or without formal local help, alternative informal help systems spring up, based on social networks such as personal help at home by children, informal meetings between colleagues, contacts with local resource people.

Whatever the type of support (formal or informal, technical or moral) provided, it seems that the rate of propagation is directly connected to the intensity of the local forms of support made available to the potential users.

Hypothesis 3: **The global context of change brings about the redefinition of roles and the transformation of social relations that impact on the change propagation process.**

The PC laptop is, for field technicians, the tangible symbol of a major technical change that fundamentally transforms both intra- and inter-group social relations. Most of the pooled persons, whatever their section, regret the loss of human contact resulting from the implementation of the new system. People feel they have lost the human side of their job because they don't see their colleagues any more, or they are working alone. This dehumanization of their working conditions affects motivation and leads to a loss of the information which used to be exchanged during daily informal meetings.

> "You don't see anybody any more and I feel that's a negative aspect. Before, when you met people, you discussed yesterday's problems. You had lunch at the same table, you spoke about specific problems in this or that field or about the teething problems of a new product. We used to share tips about many different things. Now we don't exchange any more. It's each man for himself." [P13]

> "With the PC laptop and the car at home, you don't pass by the office and you don't see anybody any more. That a pity because you wouldn't believe how much information we exchanged in a quarter of an hour in the morning. In our job, you can sometimes look for hours for the cause of a breakdown. Before, when you fixed a breakdown, you shared the solution with others. That was how you acquired experience and hands-on knowledge of the job." [P15]

The introduction of the WFM project accelerated and ensured the transfer of formal information such as working orders, time sheets, technical information. On the other hand, change seems to have damaged the informal transfer of knowledge. Change dematerialized social meeting spaces and favored the creation of virtual sections. The local offices (real spaces), which symbolized the section's life, are empty. The laptop PC allows you to start the working day at home and to end it at home. Calling on the office in the morning and meeting at mid-day in the canteen are now inadvisable. These informal meetings are considered to be unprofitable and a waste of time .

> " Communication with colleagues is finished. The offices are empty now." [P14]

We observed a general feeling of isolation among many field technicians. Change has abolished physical proximity between individuals and transformed social relations within groups. The inter-group relationships have also been affected. Change seems to foster mechanisms of competitiveness between the peers. The new system makes it possible, for example, to produce national statistics on field work and this in turn clearly puts sections in competition. Previously, the rivalry between sections was scarcely visible, in the absence of standardized, comparable data. The change generated by WFM has enabled better global organizational integration but also the destabilization of local integration, source of knowledge transfer, and of powerful interpersonal channels of communication.

In conclusion, we remind the reader that the results presented in this paper constitute only a preliminary analysis of our field data. Our research within Technico is still in progress.. These early results are proposed in order to open up useful discussion. Our findings so far will have to be verified, clarified, perhaps even qualified, as our work in Technico progresses.

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Figure 1: Conceptual framework in studying change propgation process

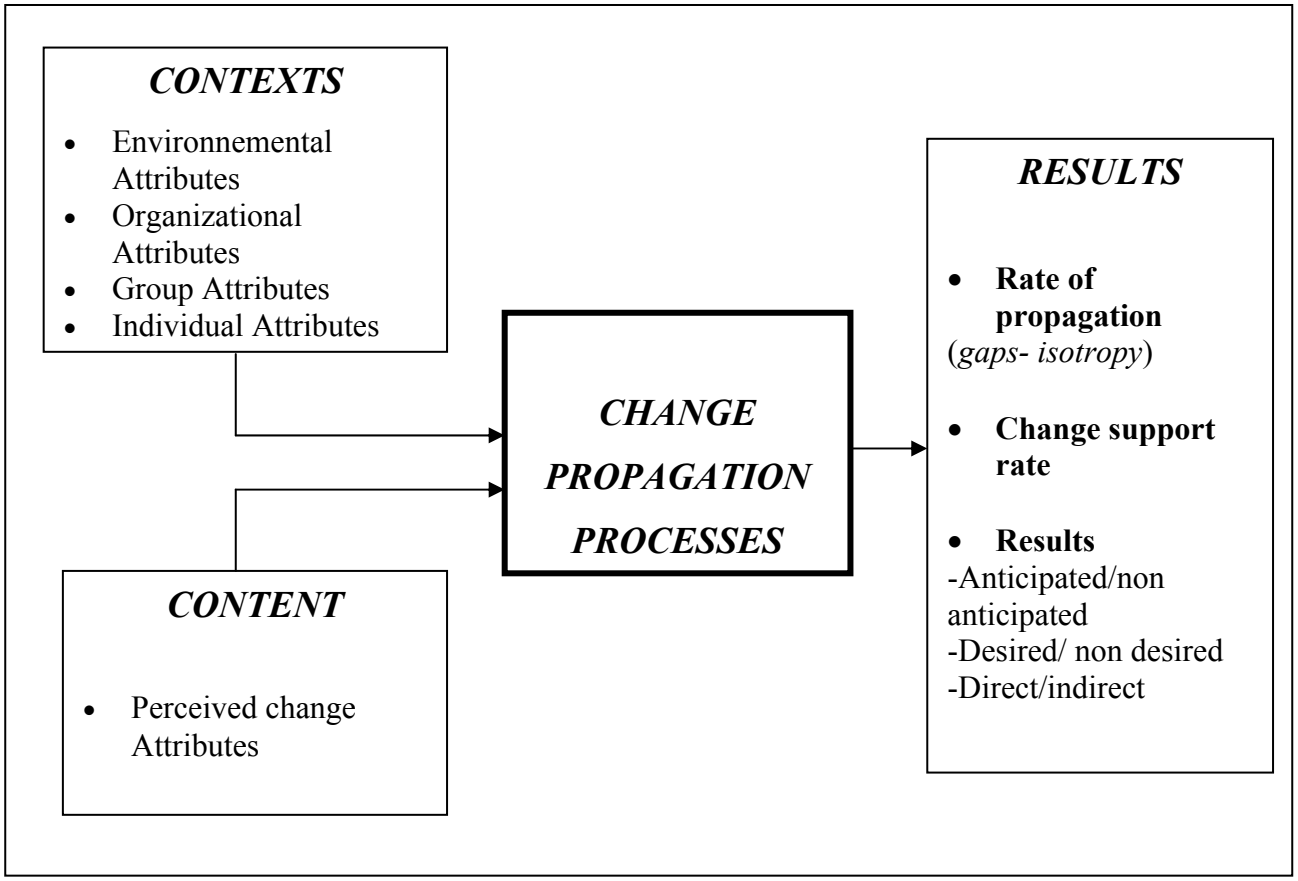

Figure 2 : *Schematic representation of the I&M restructuring process*

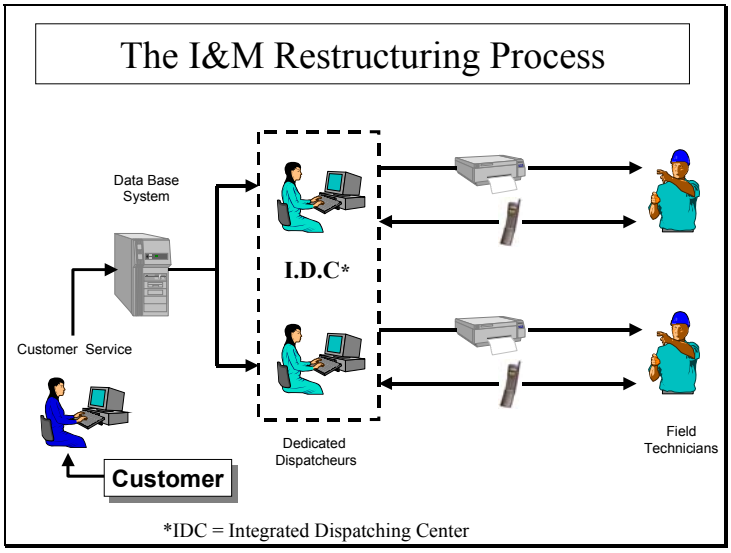

Figure 3 : *Illustration of WFM Project*

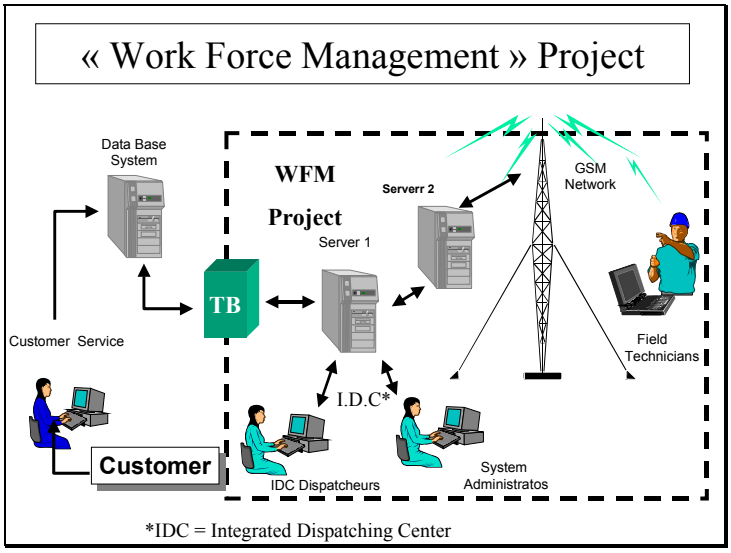

Figure 4 : *Evolution of average support rates per section (simple equipment) over time*

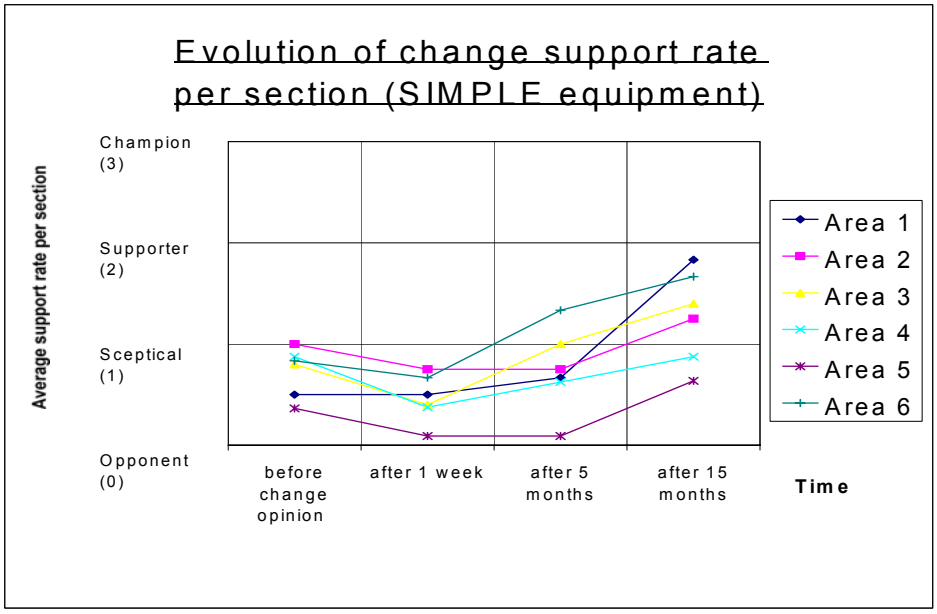

Figure 5 : *Evolution of average support rates per section (complex equipment) over time*